



Consommation et  
Affaires commerciales Canada

Consumer and  
Corporate Affairs Canada

Bureau des brevets

Patent Office

Ottawa, Canada  
K1A 0C9

(21) (A1)

2,077,119

(22)

1992/08/28

(43)

1994/03/01

5,075,6/98

(51) INTL.CL.<sup>5</sup> B60N-002/28

(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Child's Automotive Safety Booster Seat with a View

(72) Silverman, Matthew H. - U.S.A. ;

(73) Same as inventor

(57) 16 Claims

Notice: The specification contained herein as filed

**Canada**

CCA 3254 (10-92) 41 7530-21-936-3254

CHILD'S AUTOMOTIVE SAFETY BOOSTER SEAT WITH A VIEWField of the Invention

The present invention pertains to a child's automotive safety seat, and, more particularly, to a child booster safety seat that provides a good field of view, is comfortable and provides proper structural support.

## BACKGROUND OF THE INVENTION

Children's automotive safety seats must meet many criteria and regulatory standards. However, it is not uncommon to find a safety seat providing good structural support while failing to provide measurable comfort to the child; this is because many of the safety design objectives often conflict with each other. For example, it is necessary to design the center of a seat with enough rigidity to provide proper support and withstand impact forces, while, at the same time, be compressible enough to offer softness and comfortableness.

This dichotomy is also evident in the design of the side supports. The structure of the seat must have side mouldings for enveloping and supporting the occupant against lateral forces. Side supports, however, often prevent seatbelt straps from fitting snugly against the child occupant. In addition, highly prominent side supports obscure a child's view.

There have been many designs for child safety seats, owing to the fact that, very few are capable of fulfilling all of the design and safety objectives. Most of the seats represent clever compromises between conflicting objectives. In other words, structural differences are often adjusted to produce a tolerable solution; the importance of one criterion is reduced in order to bolster a seemingly antithetical criterion. This type of concession, however, does not effect excellent design.

The present invention has developed a child booster seat for an automobile that offers outstanding performance, despite the many conflicting design objectives.

The present invention meets the stringent Canadian standard of compressibility, which requires that the seat compress less than one inch under a force of five hundred pounds. Despite the rigidity and high density required to meet this strict standard, the child booster seat of this invention is also soft and comfortable. Conflicting safety design objectives are not compromised by the invention. The invention uses a central core of rigid, high-density foam to provide support. The rigid core is then overlaid with a thin layer of soft, compressible foam for comfort.

The current invention also features side supports that cushion against lateral forces and movement, while allowing a seatbelt to fit flush across the base of the seat. The side supports are also designed having a low profile, so that the child has a wide field of view.

Another dynamic of comfort is provided by this wide field of view. A child who can see is usually one who is less likely to wriggle or whine.

5

## DISCUSSION OF RELATED ART

10

15

In European Patent Application No. 0 197 910 A2, issued to FLYBORG, a child booster seat is illustrated. The child seat provides the child with a limited, rear view. The seat is positioned backwards against the front seats for support. A well is carved into the side supports for accommodating a lap seatbelt. However, the well does not lie flush with the bottom surface of the seat, so that the seatbelt will not lie flush therewith. Therefore, the belt will not provide a snug fit about a child occupant. Such a seat design may cause the occupant to "submarine" (i. e., slide out from under the belt) during a crash.

20

25

In United Kingdom Patent Application No. GB 2 154 131A, issued to SWIFT, a child vehicle seat is shown that will accommodate an automobile's lap seatbelt. The side sections of the child seat are designed to have a high profile, thus limiting the child's view. In addition, these high side projections require that the belt be held by a movable clip. The belts do not fit flush with the seat bottom surface; hence, there is the potential problem of submarining during impact.

United States Design Patent No. 266,044, issued to BLANCHARD on September 7, 1982, for "Auxiliary Seat For a Child", illustrates a safety seat that accommodates a flush-

fitting seatbelt. This is accomplished by placing side grooves in the base, eliminating side restraining members. The flush-fitting seatbelt design will prevent submarining. The absence of side members, however, does not provide the proper support for the child during either turns of the car or during a side impact.

United States Design Patent No. 264,788, issued to BLANCHARD on June 8, 1982, for "Auxiliary Seat For a Child", illustrates a safety seat that accommodates a flush-fitting seatbelt. This is accomplished by placing side grooves in the base, eliminating side restraining members along the seat bottom. The flush-fitting seatbelt design will prevent submarining. The absence of side members at the base, however, does not provide the full side support for the child during either turns of the car or during a side impact.

#### SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a child's automotive booster seat having enough rigidity to withstand high compression, and, simultaneously providing softness and comfortableness for the child occupant. Conflicting safety design objectives are accomplished by constructing the center of the booster seat from a rigid styrofoam, which is overlaid with a thin layer of soft urethane foam for comfort. The booster seat is designed to have low-profile side member supports along the back and base portions of the seat. The low-profile supports provide sufficient confinement for the child, while

allowing a wide-angle view from the seat (which is also a 2077119  
source of comfort for both children and accompanying  
adults). A portion of the side member base supports is a  
cutaway section, revealing a well that lies flush with the  
bottom seat. In this manner, the car seatbelt can be snugly  
applied about the child to prevent submarining during a  
crash. Thereby, the invention (which provides a child with  
a full four inches of height) helps position the child so  
that the child can take full advantage of a shoulder belt  
that was designed for an adult.

#### BRIEF DESCRIPTION OF THE DRAWINGS

A complete understanding of the present invention may  
be obtained by reference to the accompanying drawings, when  
considered in conjunction with the subsequent, detailed  
description, in which:

FIGURE 1 is a perspective view of the child's  
automotive safety booster seat of this invention;

FIGURE 2 is a bottom view of the child's automotive  
safety booster seat of the invention, illustrated in  
FIGURE 1;

FIGURE 3 is a front view of the child's automotive  
safety booster seat of this invention, as depicted in  
FIGURE 1;

FIGURE 4 is a top view of the child's automotive safety  
booster seat of the invention, as shown in FIGURE 1;

FIGURE 5 is a back view of the child's automotive safety booster seat of, this invention, as illustrated in FIGURE 1;

2077119

FIGURE 6 is a side view of the child's automotive safety booster seat of the invention, as shown in FIGURE 1; and

FIGURE 7 is a cross-sectional view of the child's automotive safety booster seat, along lines 7 - 7 of FIGURE 3.

For purposes of clarity and brevity, like elements and components will bear the same designations throughout the figures.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Generally speaking, the invention features a child's automotive booster seat that provides safety without restricting the child's view. The safety booster seat also meets rigorous compression standards, while simultaneously providing softness and comfort.

Now referring to FIGURES 1 through 7, a child booster seat 10 is illustrated. The booster seat 10 comprises a seat portion 11 having an internal core 22 (FIGURE 7) comprising a high-density polystyrene foam (styrofoam). The seat core 22 of polystyrene foam has a density of 2 pounds. The top 13 of the seat portion 11 is overlaid with a thin layer (about one-half-inch) of soft, compressible, blue

polyurethane foam 24. The blue polyurethane foam 24 has 2077119  
approximate density of 4 pounds. The bottom 12 of the seat  
portion 11 is overlaid with about one-quarter of an inch of  
blue polyurethane foam 26. The upper back piece 14 is also  
5 comprised of the blue polyurethane foam. The respective  
upper and lower side supports 15, 16, 17 and 18 are  
comprised of a beige polyurethane foam of a density of 1.5  
pounds.

10 The rigid core with soft, outer, compressible foam  
provides the seat with needed rigidity, while also providing  
comfort and softness for a child occupant.

15 The side supports 15, 16, 17 and 18 respectively  
provide constraint against lateral movement during  
automotive maneuvers or side impacts. These side supports  
are generally of such low profile that the forward and side  
views of the child are unobstructed. In other words, a  
forward, wide-angle view is provided despite the purpose of  
the forward and side supports being to provide confinement  
and/or constraint.

20 Cut-out portions or wells 19 and 20 are disposed,  
respectively, between the lower and upper side supports 16  
and 17; and the lower and upper side supports 15 and 18.  
These respective wells 19 and 20 are flush with the top seat  
surface 13 of seat portion 11. This allows the lap seatbelt  
25 of the automobile to be tightened in order to provide a snug  
fit against a child occupant without the possibility of the  
child submarining.

Since other modifications and changes varied to fit



particular operating requirements and environments will be  
apparent to those skilled in the art, the invention is not  
considered limited to the example chosen for purposes of  
disclosure, and covers all changes and modifications which  
do not constitute departures from the true spirit and scope  
of this invention.

Having thus described the invention, what is desired to  
be protected by Letters Patent is presented in the  
subsequently appended claims.

What is claimed is:

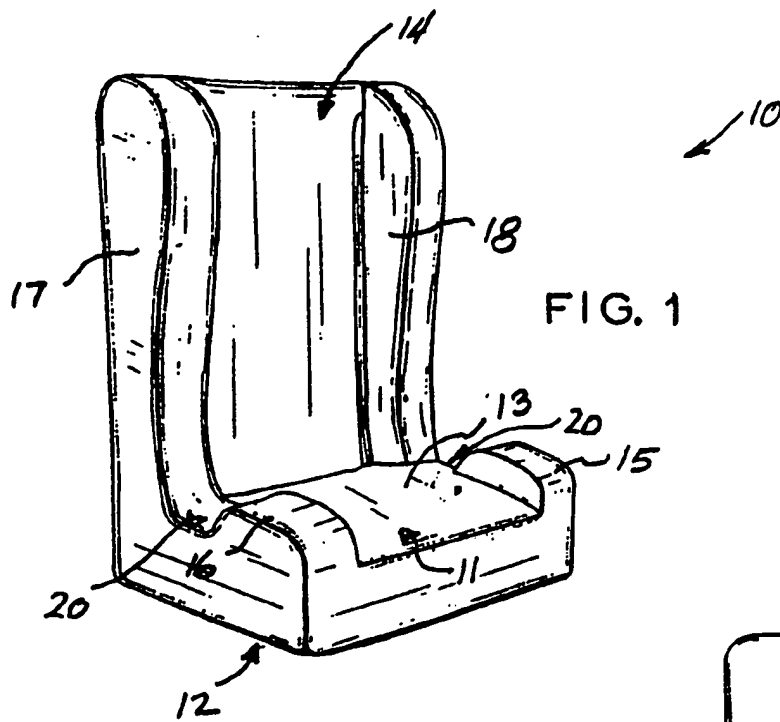


FIG. 1

10

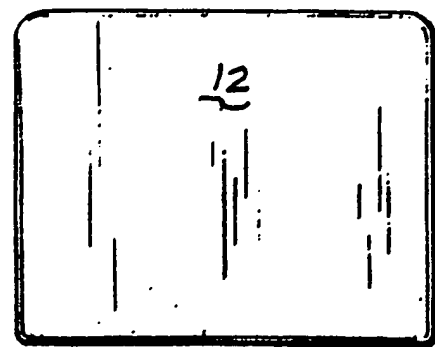


FIG. 2

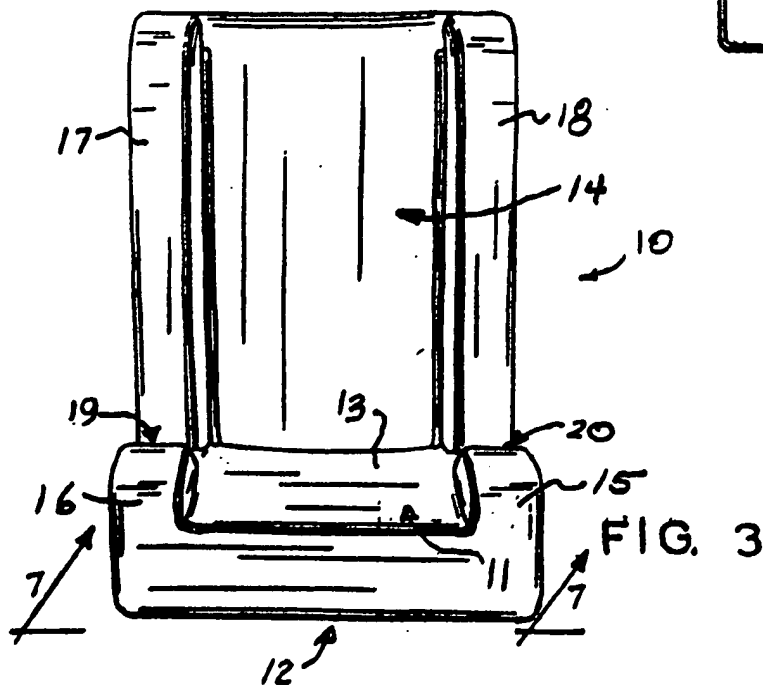


FIG. 3

Wiley, Taylor, & Francis,  
Publishers

1           1. A child's automotive booster seat providing safety  
2 and comfort to a child, occupant, said child's automotive  
3 booster seat comprising a seat portion and a back portion,  
4 said seat portion having a substantially rigid core member  
5 overlaid with a soft, compressible foam layer, a plurality  
6 of upper and lower side supports providing confinement and  
7 constraint to said child occupant, and means defining a pair  
8 of wells disposed between said upper and lower side  
9 supports, said wells being substantially flush with a  
10 surface of said seat portion, whereby an automotive lap  
11 seatbelt can be fitted snugly about said child occupant to  
12 prevent submarining during an impact or crash.

1           2. The child's automotive booster seat of claim 1,  
2 wherein said rigid core member comprises a polystyrene foam.

1           3. The child's automotive booster seat of claim 2,  
2 wherein said rigid core member of polystyrene foam has a  
3 density of 2 pounds.

1           4. The child's automotive booster seat of claim 1,  
2 wherein said soft, compressible foam layer comprises a  
3 polyurethane foam.

1           5. The child's automotive booster seat of claim 4,  
2 wherein said soft, compressible foam layer of polyurethane  
3 foam has an approximate density of 4 pounds.

1           6.    The child's automotive booster seat of claim 2077119  
2    wherein said upper and lower side supports comprise  
3    polyurethane foam.

1           7.    The child's automotive booster seat of claim 6,  
2    wherein said upper and lower side supports comprising  
3    polyurethane foam have a density of 1.5 pounds.

1           8.    A child's automotive booster seat providing safety  
2    and comfort to a child occupant, said child's automotive  
3    booster seat comprising a seat portion and a back portion,  
4    said seat portion having a substantially rigid core member  
5    comprising a polystyrene foam overlaid with a soft,  
6    compressible polyurethane foam layer, a plurality of upper  
7    and lower side supports providing confinement and constraint  
8    to said child occupant, and means defining a pair of wells  
9    disposed between said upper and lower side supports, said  
10   wells being substantially flush with a surface of said seat  
11   portion, whereby an automotive lap seatbelt can be fitted  
12   snugly about said child occupant to prevent submarining  
13   during an impact or crash.

1           9.    The child's automotive booster seat of claim 8,  
2    wherein said rigid core member of polystyrene foam has a  
3    density of 2 pounds.

1           10.   The child's automotive booster seat of claim 8,  
2    wherein said soft, compressible foam layer of polyurethane  
3    foam has an approximate density of 4 pounds.

1           11. The child's automotive booster seat of claim 8,  
2 wherein said upper and lower side supports comprise  
3 polyurethane foam.

4           12. The child's automotive booster seat of claim 11,  
5 wherein said upper and lower side supports comprising  
6 polyurethane foam have a density of 1.5 pounds.

1           13. A child's automotive booster seat providing safety  
2 and comfort to a child occupant, said automotive child  
3 booster seat comprising a seat portion and a back portion,  
4 said seat portion having a substantially rigid core member  
5 comprising a polystyrene foam overlaid with a soft,  
6 compressible polyurethane foam layer, a plurality of upper  
7 and lower side supports comprising polyurethane foam of  
8 different density than said soft, compressible polyurethane  
9 foam layer, said upper and lower side supports providing  
10 confinement and constraint to said child occupant, and means  
11 defining a pair of wells disposed between said upper and  
12 lower side supports, said wells being substantially flush  
13 with a surface of said seat portion, whereby an automotive  
14 lap seatbelt can be fitted snugly about said child occupant  
15 to prevent submarining during an impact or crash.

1           14. The child's automotive booster seat of claim 13,  
2 wherein said rigid core member of polystyrene foam has a  
3 density of 2 pounds.

1           15. The child's automotive booster seat of claim 13,  
2 wherein said soft, compressible foam layer of polyurethane  
3 foam has an approximate density of 4 pounds.

1           16. The child's automotive booster seat of claim 13,  
2 wherein said upper and lower side supports comprising  
3 polyurethane foam have a density of 1.5 pounds.

## ABSTRACT OF THE DISCLOSURE

The present invention features a child's automotive safety booster seat that has enough rigidity to withstand high compression, and, at the same time, is soft and comfortable for the child occupant. Conflicting safety design objectives are accomplished by constructing the center of the booster seat from a rigid styrofoam, which is overlaid with a thin layer of soft urethane foam for comfort. The booster seat is designed to have low-profile side member supports along the back and base portions of the seat. The low-profile supports provide sufficient confinement for the child, while allowing a wide-angle view from the seat (which is also a source of comfort for both children and accompanying adults). A portion of the side member base supports is a cutaway section, revealing a well that lies flush with the bottom seat. In this manner, the car seatbelt can be snugly applied about the child to prevent submarining during a crash. Thereby, the invention (which provides a child with a full four inches of height) helps position the child so that the child can take full advantage of a shoulder belt that was designed for an adult.

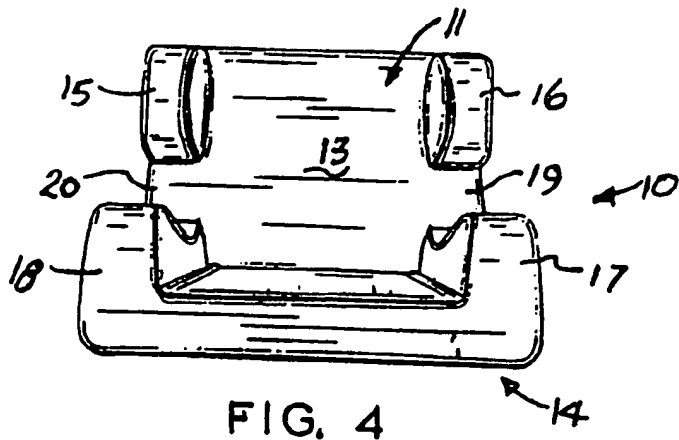


FIG. 4

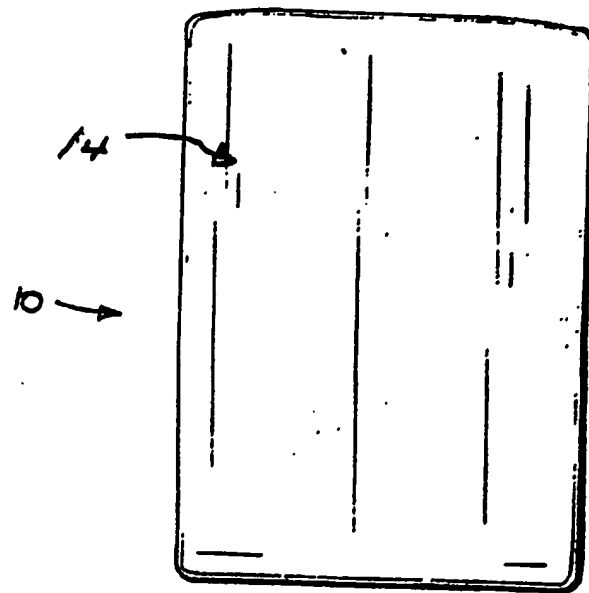


FIG. 5

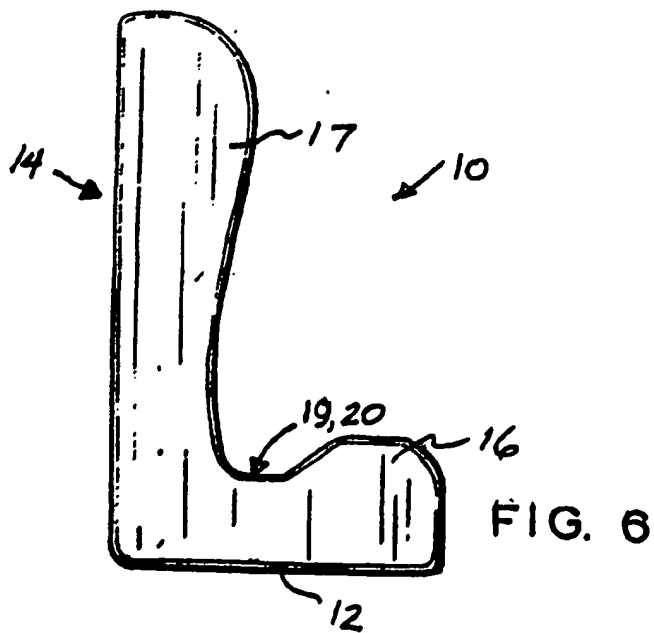


FIG. 6

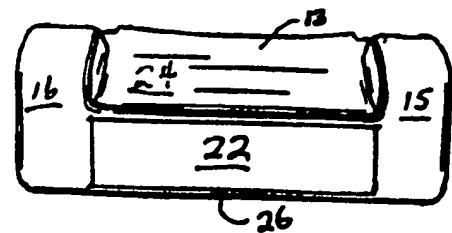


FIG. 7

*Wm. L. Galt, Jr.  
Dallas, Texas*



